CLAIMS

1. A computer programmed to undertake method acts for querying for data using a query, the method acts undertaken by the computer including:

for at least some data vectors in a data space, generating respective approximations in polar coordinates; and

based on the approximations, returning "k" nearest neighbors to the query.

2. The computer of Claim 1, wherein the method acts further comprise:

dividing the data space into plural cells; and

representing at least one data point in at least one cell in polar coordinates with respect to the at least one cell.

3. The computer of Claim 2, wherein the data space has "d" dimensions and the method acts further comprise:

determining a number of "b" bits to be assigned to each cell; and

dividing the data space into 2^{bd} cells.

4. The computer of Claim 1, wherein each approximation defines a lower bound d_{min}, and the method acts further comprise:

generating a candidate set of approximations based at least on the lower bounds d_{min} of the approximations.

5. The computer of Claim 4, wherein the query can be represented by a query vector **q**, and the method acts further comprise:

adding a first approximation having a first lower bound d_{min1} to the candidate set if $d_{min1} < k\text{-}NN^{dist}(\mathbf{q})$, wherein $k\text{-}NN^{dist}(\mathbf{q})$ is the k^{th} largest distance between the query vector **q** and nearest neighbor vectors **p**.

6. The computer of Claim 5, wherein the method acts further comprise using the candidate set to return "k" nearest neighbors vectors **p** to the query vector **q**.

7. The computer of Claim 6, wherein not all vectors **p** corresponding to approximations in the candidate set are examined to return the "k" nearest neighbors.

8. A computer program product including a program of instructions having:

computer readable code means for generating approximations including local polar coordinates of at least some data vectors **p** in at least one data set having a dimensionality of "d", the local polar coordinates being independent of "d"; and

computer readable code means for using the approximations to return "k" nearest neighbors to a query.

9. The computer program product of Claim 8, wherein the means for generating generates respective approximations of data vectors **p** in local polar coordinates.

10. The computer program product of Claim 9, further comprising:

computer readable code means for dividing the data space into plural cells; and

computer readable code means for representing each approximation in polar coordinates with respect to one of the cells.

11. The computer program product of Claim 10, wherein the data space has "d" dimensions, further comprising:

computer readable code means for determining a number of "b" bits to be assigned to each cell; and

computer readable code means for dividing the data space into 2^{bd} cells.

12. The computer program product of Claim 9, wherein each approximation defines a lower bound d_{min} and an upper bound d_{max}, and the product further comprises:

computer readable code means for generating a candidate set of approximations based at least on the lower bounds d_{min} and upper bounds d_{max} of the approximations.

13. The computer program product of Claim 12, further comprising:

computer readable code means for adding a first approximation having a first lower bound d_{min1} to the candidate set if $d_{min1} < k\text{-}NN^{dist}(\mathbf{q})$, wherein $k\text{-}NN^{dist}(\mathbf{q})$ is the

k^{th} largest distance between the query vector **q** and nearest neighbor vectors **p** associated with approximations in the candidate set.

14. The computer program product of Claim 13, further comprising computer readable code means for using the candidate set to return "k" nearest neighbors vectors **p** to the query vector **q**.

15. A computer-implemented method for finding, in a data space, "k" closest data vectors **p** to a query vector **q**, comprising:

rendering approximations of at least some of the data vectors **p** using local polar coordinates;

filtering the approximations; and

after filtering, returning the "k" closest data vectors **p**.

16. The method of Claim 15, further comprising:

dividing the data space into plural cells; and

representing each approximation in polar coordinates with respect to one of the cells.

17. The method of Claim 16, wherein the data space has "d" dimensions and the method further comprises:

determining a number of "b" bits to be assigned to each cell; and

dividing the data space into 2^{bd} cells.

18. The method of Claim 15, wherein each approximation defines a lower bound d_{min}, and the method further comprises:

generating a candidate set of approximations based at least on the lower bounds d_{min} of the approximations.

19. The method of Claim 18, further comprising:

adding a first approximation having a first lower bound d_{min1} to the candidate set if $d_{min1} < k\text{-}NN^{dist}(\mathbf{q})$, wherein $k\text{-}NN^{dist}(\mathbf{q})$ is the k^{th} largest distance between the query vector **q** and nearest neighbor vectors **p** associated with approximations in the candidate set.

20. The method of Claim 19, further comprising using the candidate set to return "k" nearest neighbors vectors **p** to the query vector **q**.

21. The method of Claim 20, wherein not all data vectors **p** corresponding to approximations in the candidate set are examined to return the "k" nearest neighbors vectors **p**.

22. The computer of Claim 4, wherein each approximation defines an upper bound d_{max}, and the method acts further comprise:

generating a candidate set of approximations based at least on the upper bounds d_{max} of the approximations.

23. The computer program product of Claim 12, wherein each approximation defines an upper bound d_{max}, and the product further comprises:

computer readable code means for generating a candidate set of approximations based at least on the upper bounds d_{max} of the approximations.

24. The computer of Claim 1, wherein each approximation defines an upper bound d_{max}, and the method acts further comprise:

generating a candidate set of approximations based at least on the upper bounds d_{max} of the approximations.